WHAT IS CLAIMED IS :

1. A method for the fourth-order, blind identification of at least two sources in a system comprising a number of sources P and a number N of reception sensors receiving the observations, said sources having different tri-spectra, wherein the method comprises at least the following steps:

a) a step for the fourth-order whitening of the observations received on the reception sensors in order to orthonormalize the direction vectors of the sources in the matrices of quadricovariance of the observations used,

b) a step for the joint diagonalizing of several whitened matrices of quadricovariance (step a) in order to identify the spatial signatures of the sources.

2. A method according to claim 1, wherein the observations used correspond to the time-domain averaged matrices of quadricovariance defined by:

$$Q_x(\tau_1,\tau_2,\tau_3) = \sum_{p=1}^{P} c_p(\tau_1,\tau_2,\tau_3)\,(a_p\otimes a_p^*)\,(a_p\otimes a_p^*)^H \qquad (4a)$$

$$= A_Q\ C_s(\tau_1,\tau_2,\tau_3)\ A_Q^{\ H} \qquad (4b)$$

where A_Q is a matrix with a dimension (N^2x P) defined by $A_Q = [(\boldsymbol{a}_1\otimes\boldsymbol{a}_1^*), \ldots, (\boldsymbol{a}_p\otimes\boldsymbol{a}_p^*)]$, $C_s(\tau_1,\tau_2,\tau_3)$ is a diagonal matrix with a dimension (P x P) defined by $C_s(\tau_1,\tau_2,\tau_3) = \mathrm{diag}[c_1(\tau_1,\tau_2,\tau_3),\ldots, c_p(\tau_1,\tau_2,\tau_3)]$ and $c_p(\tau_1,\tau_2,\tau_3)$ is defined by:

$$c_p(\tau_1,\tau_2,\tau_3) = \langle \mathrm{Cum}(s_p(t), s_p(t-\tau_1)^*, s_p(t-\tau_2)^*, s_p(t-\tau_3))\rangle \qquad (5)$$

3. A method according to claim 2, comprises at least the following steps:

Step 1: the estimation, through $Q;^{\wedge}{}_x$, of the matrix Q_X, from the L observations $\boldsymbol{x}(lT_e)$ using a non-skewed and asymptotically consistent estimator.

Step 2: the eigen-element decomposition of $Q;^{\wedge}{}_x$, the estimation of the number of sources P and the limiting of the eigen-element decomposition to

the P main components: $Q;^{\wedge}{}_x \approx E;^{\wedge}{}_x\ \Lambda;^{\wedge}{}_x\ E;^{\wedge}{}_x{}^{H}$, where $\Lambda;^{\wedge}{}_x$ is the diagonal matrix containing the P eigenvalues with the highest modulus and $E;^{\wedge}{}_x$ is the matrix containing the associated eigenvectors.

Step 3: the building of the whitening matrix: $T;^{\wedge} = (\Lambda;^{\wedge}{}_x)^{-1/2}\ E;^{\wedge}{}_x{}^{H}$.

Step 4: the selection of K triplets of delays $(\tau_1{}^k,\tau_2{}^k,\tau_3{}^k)$ where $|\tau_1{}^k|+|\tau_2{}^k|+|\tau_3{}^k|\neq 0$.

Step 5: the estimation, through $Q;^{\wedge}{}_x(\tau_1{}^k,\tau_2{}^k,\tau_3{}^k)$, of the K matrices $Q_x(\tau_1{}^k,\tau_2{}^k,\tau_3{}^k)$.

Step 6: the computation of the matrices $T;^{\wedge}\ Q;^{\wedge}{}_x(\tau_1{}^k,\tau_2{}^k,\tau_3{}^k)\ T;^{\wedge H}$ and the estimation, by $U;^{\wedge}{}_{sol}$, of the unitary matrix U_{sol} by the joint diagonalizing of the K matrices $T;^{\wedge}\ Q;^{\wedge}{}_x(\tau_1{}^k,\tau_2{}^k,\tau_3{}^k)\ T;^{\wedge H}$

Step 7: the computation of $T;^{\wedge\ \#}U;^{\wedge}{}_{sol}=[\boldsymbol{b};^{\wedge}{}_1\ldots\boldsymbol{b};^{\wedge}{}_P]$ and the building of the matrices $B;^{\wedge}{}_l$ sized $(N \times N)$.

Step 8: the estimation, through_$\boldsymbol{a};^{\wedge}{}_P$, of the signatures a_q $(1\leq q \leq P)$ of the P sources in applying a decomposition into elements on each matrix $B;^{\wedge}{}_l$.

4. A method according to claim 1 to 3, comprising at least one step for the evaluation of the quality of the identification of the associated direction vector in using a criterion such as:

$$\mathrm{D}(A, \hat{A}) = (\alpha_1, \alpha_2, \ldots\ldots, \alpha_P) \qquad (16)$$

where

$$\alpha_p = \min_{1\leq i\leq P}[\mathrm{d}(\boldsymbol{a}_p, \hat{\boldsymbol{a}}_i)] \qquad (17)$$

and where $\mathrm{d}(\boldsymbol{u},\boldsymbol{v})$ is the pseudo-distance between the vectors $\boldsymbol{u}$ and $\boldsymbol{v}$, such that:

$$\mathrm{d}(\boldsymbol{u}, \boldsymbol{v}) = 1 - \frac{|\boldsymbol{u}^{H}\boldsymbol{v}|^2}{(\boldsymbol{u}^{H}\boldsymbol{u})(\boldsymbol{v}^{H}\boldsymbol{v})} \qquad (18)$$

5. A method according to claim 1, comprising at least one step of fourth-order cyclical after the step a) of fourth-order whitening.

6. A method according to claim 5, wherein the identification step is performed in using fourth-order statistics.

7. A method according to claim 1 wherein the number of sources P is greater than or equal to the number of sensors.

8. A method according to claim 1, comprising at least one step of goniometry using the identified signature of the sources.

9. A method according to claim 1, comprising at least one step of spatial filtering after the identified sign ature of the sources.

10. A use of the method according to claim 1 in a communications network.